Abstracts

Numerical Analysis of Eigenvalue Solution of Disk Resonator (Short Papers)

K. Tanabe, Y. Kobayashi and S. Tanaka. "Numerical Analysis of Eigenvalue Solution of Disk Resonator (Short Papers)." 1975 Transactions on Microwave Theory and Techniques 23.6 (Jun. 1975 [T-MTT]): 508-511.

A formulation is proposed to calculate the frequencies of the eigenmodes for a resonator with a thin conductor disk placed in the median plane between two infinite parallel conductor plates. The numerical analysis is carried out for the E- and EH-modes, and these eigenvalues are calculated as the function of the ratio of the disk radius to the distance between the disk and one of the infinite conductor plates. It is shown that at a ratio greater than a certain value the exact eigenvalue is smaller than the one predicted by applying the conventional method for two-dimensional bifurcation of rectangular waveguide, but the latter becomes closer to the exact one with increasing ratio. The availability of our exact eigenvalues is demonstrated in determining experimentally the dielectric constant of Teflon plate specimen by applying those values. Then the constancy of the measured dielectric constant is confirmed irrespective of the modes and the ratios.

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